

Claims

1. A teat rubber (1, 100, 200, 301, 401, 501, 601) for use on a milking cup of a milking apparatus, comprising

a head part (3, 103, 203, 303, 403, 503, 603) having provided thereon a sealing lip (30, 130, 230, 330, 430, 530, 630) that forms an insertion opening (49, 149, 249, 349, 449, 549, 649) for a teat (190),

a holding edge (8, 108, 208, 308, 408, 508, 608) for grasping a milking cup sleeve (2, 102, 202, 302, 402, 502, 602),

a suction connecting piece (4, 104, 204, 304, 404, 504, 604) connected to the head part (3, 103, 203, 303, 403, 503, 603) as well as

a planar teat bearing section (28, 128, 228, 328, 428, 528, 628) which is formed on the sealing lip (30, 130, 230, 330, 430, 530, 630) provided on the head part (3, 103, 203, 303, 403, 503, 603) and which defines the insertion opening (49, 149, 249, 349, 449, 549, 649),

characterized in that

the teat rubber (1, 100, 200, 301, 401, 501, 601) comprises an adhesion element that improves the adhesion between the teat (190) and the teat rubber (1, 100, 200, 301, 401, 501, 601) without affecting the milking process.

2. A teat rubber according to claim 1, **characterized in that** the adhesion element comprises a pre-stressing element (240,

431, 520) which exerts a radially effective force on the planar teat bearing section (228, 428, 528).

3. A teat rubber according to claim 2, **characterized in that** the pre-stressing element (431, 520) is implemented such that it is able to cause a reduction of the radius of the insertion opening (49, 149, 249, 349, 449, 549, 649).

4. A teat rubber according to claim 2 or 3, **characterized in that** the pre-stressing element (431, 520) comprises an annular element.

5. A teat rubber according to claim 4, **characterized in that** the annular element is produced from a resilient plastic material, preferably rubber, or from metal, preferably a spring steel.

6. A teat rubber according to claim 4 or 5, **characterized in that** the annular element (431b, 520) is arranged on an inner wall of a cavity (423, 522) in the head part (403, 503) of the teat rubber (401, 501).

7. A teat rubber according to claim 4, 5 or 6, **characterized in that** a boundary of the planar teat bearing section (528) has formed thereon a first projection (524) which is directed towards the cavity (522) and which prevents the annular element (520) from slipping off.

8. A teat rubber according to claim 7, **characterized in that** the inner wall of the cavity (522) has formed thereon a second projection (521) adjacent said first projection (520) in such a way that the space between said first and second projections (520, 521) forms a groove which accommodates the annular element (520).

9. A teat rubber according to claim 4, **characterized in that** the annular element (431) is arranged on an outer wall of the head part (403) of the teat rubber (401).

10. A teat rubber according to one of the claims 4 to 9, **characterized in that** the annular element (520) is provided with a folding mechanism by means of which said annular element (520) can be changed over between two cross-sections.

11. A teat rubber according to claim 10, **characterized in that** the folding mechanism comprises hinge portions (523) so that a subarea of the annular element (520) can change between a folded and an unfolded condition, when pressure is radially applied to the annular element (520).

12. A teat rubber according to claim 9, **characterized in that** the outer wall of the head part (403) comprises at least two depressions with different outer diameters in which the annular element (431) can be arranged in a displaceable manner so that the cross-section of the insertion opening (449) can be varied.

13. A teat rubber according to claim 2, **characterized in that** the pre-stressing element comprises resilient lamellae (240) which are arranged in the cavity in the head part (203).

14. A teat rubber according to claim 13, **characterized in that** the lamellae (240a) are arranged radially.

15. A teat rubber according to claim 13, **characterized in that** the radially arranged lamellae (240b) are implemented such that they comprise a Y-shaped bifurcation in the radial direction.

16. A teat rubber according to one of the preceding claims, **characterized in that** sub- areas of the planar teat bearing sec-

tion (28, 128, 228, 328, 428, 528, 628) are movable in a radial direction (R).

17. A teat rubber according to one of the preceding claims, **characterized in that** sub-areas of the planar teat bearing section (28, 128, 228, 328, 428, 528, 628) are movable with respect to an angular position (Θ_1 , Θ_2) relative to the sealing lip (30, 130, 230, 330, 430, 530, 630).

18. A teat rubber according to one of the preceding claims, **characterized in that** the movability of the subareas of the planar teat bearing section (28, 128, 228, 328, 428, 528, 628) relative to one another and relative to the sealing lip (30, 130, 230, 330, 430, 530, 630) is achieved by the use of a soft, resilient material.

19. A teat rubber according to claim 18, **characterized in that** the elastic material is latex or silicone rubber.

20. A teat rubber according to one of the claims 16 to 19, **characterized in that** the movability of the subareas of the planar teat bearing section (28) is achieved by overlapping segments (12b).

21. A teat rubber according to one of the claims 16 to 20, **characterized in that** the sub- areas of the planar teat bearing section (28) are resiliently interconnected by overlapping segments (12a), whereby the movability of the subareas relative to one another is achieved.

22. A teat rubber according to one of the claims 16 to 21, **characterized in that** the subareas of the planar teat bearing section (28) are interconnected by a constriction and/or a portion of reduced material

thickness, whereby the movability of the subareas relative to one another is achieved.

23. A teat rubber according to one of the claims 16 to 21, **characterized in that** the subareas of the planar teat bearing section (28) are interconnected by a section whose material properties have been changed, whereby the movability of the subareas relative to one another is achieved.

24. A teat rubber according to one of the claims 16 to 21, **characterized in that** the subareas of the planar teat bearing section (28) are interconnected through portions consisting of a material that is softer than the material of said subareas.

25. A teat rubber according to one of the preceding claims, **characterized in that** the head part (403) has predetermined bending points (432, 433, 434, 435), said predetermined bending points (432, 433, 434, 435) leading to a deformation of the head part (403), when a pressure difference between the pulsation chamber (410) and the surroundings is generated.

26. A teat rubber according to claim 25, **characterized in that** the predetermined bending points (432, 433, 434, 435) are arranged such that the teat bearing section (428) on the head part (403) is adapted to be moved alternately towards and away from the pulsation chamber (423) in accordance with a change of pressure.

27. A teat rubber according to one of the preceding claims, **characterized in that** the teat bearing section (328) is releasably connected to the head part (303).

28. A teat rubber according to claim 27, **characterized in that** the releasable teat bearing section (328) is implemented as

a resilient formed part having a shape similar to that of a hollow cylinder and including in the outer surface thereof a circumferentially extending indentation (313) which is adapted for engagement with the sealing lip (330).

29. A teat rubber according to claim 28, **characterized in that** an inner width of the outer, circumferentially extending indentation (313) exceeds the thickness of the sealing lip (330) so that a movable connection can be established between the teat bearing section (312) and the sealing lip (330).

30. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to one of the preceding claims, **characterized in that** a part of the insertion opening (49, 149, 249, 349, 449, 549, 649) has a conically tapering surface (625), which conically tapers towards the inner side of the teat rubber (1, 100, 200, 301, 401, 501, 601) in such a way that the inner annular fold (Fuerstenberg'sche Venenring) (150) located on the base of the teat cannot come into contact with the teat rubber (1, 100, 200, 301, 401, 501, 601) and that pressure cannot be applied thereto, not even if the milking cup should shift in the direction of the udder.

31. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 30, **characterized in that** the boundary of a wide opening of the conically tapering insertion opening (49, 149, 249, 349, 449, 549, 649) is followed by an udder bearing surface (670) by means of which the teat (190) and parts of the udder with the inner annular fold (150) can be prevented from being drawn into the teat rubber (1, 100, 200, 301, 401, 501, 601) by a milking vacuum, when the udder shrinks during the milking process, so that said inner annular fold (150) cannot enter the narrow, pressure-exerting area of the teat rubber (1, 100, 200, 301, 401, 501, 601).

32. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 30 or 31, **characterized in that**, when seen in a cross-sectional view, the conically tapering surface (625) of the conically tapering insertion opening (49, 149, 249, 349, 449, 549, 649) is concave, convex or linear.

33. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 30 or 31, **characterized in that** a transition (640) between the conically tapering surface (625) and the planar teat bearing section (628) and the udder bearing surface (670), respectively, is implemented in a hingelike manner.

34. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 33, **characterized in that** the hingelike transition (640) between the conically tapering surface (625) and the planar teat bearing section (628) and the udder bearing surface (670), respectively, comprises a portion of reduced material thickness, an indentation or a variation of the material properties in comparison with the properties of the adjoining material, so that the transition (640) will assume hingelike properties.

35. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to one of the claims 2 to 34, **characterized in that** the adhesion means is formed in that at least a part of the planar teat bearing section (28, 128, 228, 328, 428, 528, 628) and/or of the inner surfaces of the suction connecting piece (4, 104, 204, 304, 404, 504, 604) have cushioned surfaces.

36. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 35, **characterized in that** the cushioned surface consists of a foamed elastomer.

37. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 36, **characterized in that** the foamed elastomer is a foam silicone.

38. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 36 or 37, **characterized in that** the foamed elastomer is sprayed onto the surface of the component in question.

39. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 36 or 37, **characterized in that** the whole planar teat bearing section (28, 128, 228, 328, 428, 528, 628) and/or the suction connecting piece (4, 104, 204, 304, 404, 504, 604) consist of the foamed elastomer.

40. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to one of the claims 35 to 39, **characterized in that** the cushioned surfaces are implemented as cushioned pockets.

41. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 35, **characterized in that** the cushioned surface is a fluid-filled pad.

42. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 40 or 41, **characterized in that** the cushioned pocket or the fluid-filled pad is a replaceable insert.

43. A teat rubber (1, 100, 200, 301, 401, 501, 601) for use on a milking cup of a milking apparatus, comprising

a head part (3, 103, 203, 303, 403, 503, 603) having provided thereon a sealing lip (30, 130, 230, 330, 430, 530, 630) that forms an insertion opening (49, 149, 249, 349, 449, 549, 649) for a teat (190),

a holding edge (8, 108, 208, 308, 408, 508, 608) for grasping a

milking cup sleeve (2, 102, 202, 302, 402, 502, 602),

a suction connecting piece (4, 104, 204, 304, 404, 504, 604) connected to the head part (3, 103, 203, 303, 403, 503, 603) as well as

a planar teat bearing section (28, 128, 228, 328, 428, 528, 628) which is formed on the sealing lip (30, 130, 230, 330, 430, 530, 630) provided on the head part (3, 103, 203, 303, 403, 503, 603) and which defines the insertion opening (49, 149, 249, 349, 449, 549, 649),

characterized in that

a part of the insertion opening (49, 149, 249, 349, 449, 549, 649) conically tapers towards the inner side of the teat rubber (1, 100, 200, 301, 401, 501, 601) in such a way that the inner annular fold (Fuerstenberg'sche Venenring) (150) located on the base of the teat cannot come into contact with the teat rubber (1, 100, 200, 301, 401, 501, 601) and that pressure cannot be applied thereto, not even if the milking cup should shift in the direction of the udder.

44. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 43, **characterized in that** the boundary of a wide opening of the conically tapering insertion opening (49, 149, 249, 349, 449, 549, 649) is followed by an udder bearing surface (670) by means of which the teat (190) and parts of the udder with the inner annular fold (150) can be prevented from being drawn into the teat rubber (1, 100, 200, 301, 401, 501, 601) by a milking vacuum, when the udder shrinks during the milking process, so that said inner annular fold (150) cannot enter the nar-

row, pressure-exerting area of the teat rubber (1, 100, 200, 301, 401, 501, 601).

45. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 43 or 44, **characterized in that**, when seen in a cross-sectional view, a conically tapering surface of the conically tapering insertion opening (49, 149, 249, 349, 449, 549, 649) is concave, convex or linear.

46. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 44 or 45, **characterized in that** a transition (640) between the conically tapering surface (625) and the planar teat bearing section (628) and the udder bearing surface (670), respectively, is implemented in a hingelike manner.

47. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 46, **characterized in that** the hingelike transition (640) between the conically tapering surface (625) and the planar teat bearing section (628) and the udder bearing surface (670), respectively, comprises a portion of reduced material thickness, an indentation or a variation of the material properties in comparison with the properties of the adjoining material, so that the transition (640) will assume hingelike properties.

48. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to one of the claims 43 to 47, **characterized in that** at least a part of the planar teat bearing section (28, 128, 228, 328, 428, 528, 628) and/or of the inner surfaces of the suction connecting piece (4, 104, 204, 304, 404, 504, 604) have cushioned surfaces.

49. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 48, **characterized in that** the cushioned surface consists of a foamed elastomer.

50. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 49, **characterized in that** the foamed elastomer is a foam silicone.

51. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 49 or 50, **characterized in that** the foamed elastomer is sprayed onto the surface of the component in question.

52. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 49 or 50, **characterized in that** the whole planar teat bearing section (28, 128, 228, 328, 428, 528, 628) and/or the suction connecting piece (4, 104, 204, 304, 404, 504, 604) consist of the foamed elastomer.

53. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to one of the claims 48 to 52, **characterized in that** the cushioned surfaces are implemented as cushioned pockets.

54. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 48, **characterized in that** the cushioned surface is a fluid-filled pad.

55. A teat rubber (1, 100, 200, 301, 401, 501, 601) according to claim 53 or 54, **characterized in that** the cushioned pocket or the fluid-filled pad is a replaceable insert.